

REMARKS

Claims 1, 30 and 38 have been amended. Claims 40-46 have been canceled and claims 47-50 have been added. Claims 1-39 and 47-50 are pending.

Claim Rejections – 35 U.S.C. §112

Claims 39 and 41-43 were rejected under 35 U.S.C. §112. Figure 8 has been amended to include a third inductance (40) in series with a third conductor (4). Figures 5 and 6 also have been amended to include a reference to the third inductor.

Support for the amendment is found in the specification at page 12, line 26. The specification makes specific reference to a third inductor coupled in series with a third conductor in instances where the electrical power distribution network has three-phases. No new matter has been added. The specification has been amended to identify the components on the amended figure.

Claim 39 recites, “a third series inductance means coupled in series with a third conductor of the network.” This element is disclosed in the specification as noted above and now illustrated in Figure 8.

Claims 41-43 have been canceled.

Claim 39 complies with the enablement requirement of 35 U.S.C. §112. The applicants request withdrawal of the §112 rejection of this claim.

Claim Rejections – 35 U.S.C. §102

Claims 1, 2, 6-11, 15, 17-23 and 29-32 were rejected as being anticipated by U.S. Pat. No. 6,373,257 to Macbeth et al. Claim 1 has been amended and the applicants respectfully traverse this rejection.

Macbeth et al. discloses a current transformer (71) having a center-tapped secondary winding producing first and second signal voltages of opposite polarity with

respect to the center-tap (53). A step of current in the primary winding in one direction produces a first pulse of voltage of one polarity, with respect to the center-tap at one end of the secondary followed by a step of current in the other direction, which produces a second pulse of voltage of the same polarity with respect to the center tap at the other end of the secondary. Col. 2, lines 12-23, col. 7, line 61 to col. 8, line 35 and FIG. 5. The first and second pulses are required in Macbeth to trigger two timers (11), (14): one timer is responsive to a negative going pulse and one responsive to a positive going pulse. The first pulse of voltage triggers one of the timers (11) and (14). The second pulse of voltage in the opposite direction will trigger the other timer (11) or (14). Even if the transformer has no center-tap, Macbeth et al. requires an inverter to create the second timer trigger signal. Col. 2, lines 32-38.

In contrast, claim 1 of the present invention has been amended to recite arc detection means to “identify when the single waveform of the voltage across the series inductance means is representative of arcing on the network and to generate an arc detection signal from the single waveform when the single waveform is representative of arcing on the network.” The amendment is supported in the specification at page 7, lines 4-7 and in FIGS. 3, 4 that disclose a single waveform on line 34, which is the waveform across series inductance 20, is provided to the arc detector circuit 24.

Arc detector circuit 24 receives the di/dt waveform signal of the current in the neutral conductor 18 from inductor 20. This single waveform is analyzed to determine if arcing is present. Accordingly, when arc detector circuit 24 detects the occurrence of an arc based upon the single waveform produced by series connected current sensing inductor 20, a trip signal is applied to circuit interrupter 28, which disconnects power to the load.

Our claim 1 clearly avoids the Macbeth reference, which requires two waveforms, by reciting that “... a voltage is produced across the series inductance means having a single waveform...” in combination with .. arc detection means coupled to identify when the single waveform of the voltage across the series inductance means...” (underlining

added for emphasis). Macbeth '277 discloses an arc detection circuit that requires two waveforms.

Claims 2, 6-11, 15, 17-23 and 29-32 depend either directly or indirectly from claim 1 and should be allowable for at least the same reasons.

Claims 38-40 were rejected as anticipated by U.S. Pat. No. 6,417,671 to Tiemann. The applicants respectfully traverse this rejection.

Tiemann discloses using a first Hall effect semiconductor current sensor (50) in an over-current detection circuit (32) for a first conductor (L1). Similarly, a second Hall effect semiconductor current sensor (52) is used in an over-current detection circuit (34) for a second conductor (L2). No metallic connections exist between sensors (50) and (52) and respective conductors L1, L2. *See* Col. 2, lines 26-34 and FIG. 2. Hall effect sensors are responsive to the magnetic field strength in close proximity to the current conductor.

In operation, Hall effect current sensors (50) and (52) sense current signals in conductors (L1) and (L2), respectively. Operational amplifiers (54) and (56) pass the signals sensed respectively by sensors (50) and (52) to trip circuit (20), which trips breaker (22) if the signal reaches a predetermined trip magnitude. There is no metallic connection between a Hall effect sensor and a conductor from which current is being sensed. Col.2 lines 45-54.

Thus, the current sensor of Tiemann is neither an inductor nor is it in series with the conductor as disclosed and claimed by us.

In contrast, claim 38 recites a “first series inductance means . . . coupled to a first of the at least two conductors” and “a second series inductance means . . . coupled to a second of the at least two conductors.” Both of the inductance means are in series with a conductor. In each element, the series inductance means is in series with the respective conductor. A series circuit is “[a]n electric circuit connected so that current passes through each circuit element in turn without branching.” *The American Heritage*

Dictionary of the English Language, Fourth Edition (2000). Thus, the series inductance means is connected to the respective conductors.

Further, claim 38 recites “an arc detection means responsive to the . . . voltages across . . . the series inductance means to determine when a waveform indicative of arcing on the network is present.” The voltage across the inductance means of the present invention, unlike in Tiemann, is a function of the derivative of the current through the inductance means. In Tiemann, the Hall effect sensors are responsive in proportion to the magnitude of the current through the conductor, not the derivative. Tiemann does not disclose an apparatus for detecting arcs on an electrical power distribution network having at least two conductors including an inductive means in series with a conductor as recited in our claim 38.

Claim 39 depends from claim 38 and should be allowable for at least the same reason.

Claims 40-46 have been canceled. Thus, the rejection of those claims is moot.

Claim Rejections – 35 U.S.C. §103

Claims 3-5, 12-14, 16, 24-27 and 33-37 depend from and include all the limitations of claim 1 and therefore avoid the various combinations recited by the Examiner. The applicants respectfully traverse this rejection

Claim 1 is patentable over the cited references, as described above. None of the additionally cited references disclose or suggest the elements lacking in Macbeth ‘257, as discussed above. In particular, none of the references disclose or suggest an arc detection means to “identify when the single waveform of the voltage across the series inductance means is representative of arcing on the network and to generate an arc detection signal from the single waveform when the single waveform is representative of arcing on the network” as recited in claim 1. Claims 3-5, 12-14, 16, 24-27 and 33-37 depend from claim 1 and, therefore, are believed to be in allowable form.

Claim 46 was rejected under 35 U.S.C. §103 as being unpatentable over Tiemann in view of Blades. Claim 46 has been canceled. The rejection is moot.

Miscellaneous

The specification has been amended to correct a typographical error in the reference number for power supply in the paragraph beginning on page 11, line 6.

Figures 4, 5 and 8 have been amended to more clearly illustrate the wiring of the series inductance means 20, 30 to the respective conductors 12, 16. The wiring of the inductance means 20, 30 are described in the specification at, for example, page 6, line 16 to page 7, line 12. No new matter has been added

Early and favorable reconsideration is respectfully requested. The Commissioner is hereby authorized to charge any fees which may be required for the amendment, or credit any overpayment to Deposit Account No. 50-1561 of Greenberg Traurig, LLP.

In the event that an extension of time is required to make this amendment timely filed, the Commissioner is requested to grant a petition for that extension of time which is required to make this amendment timely and is hereby authorized to charge any fee for such an extension of time or credit an overpayment for an extension of time to Deposit Account No. 50-1561 of Greenberg Traurig, LLP.

Respectfully submitted,



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IN THE DRAWINGS:

The following figures have been amended. An explanation of the amendments are in the Remarks section:

Figure 4 has been amended to clarify the wiring of the series inductance means 20, 30 to respective conductors 12, 16;

Figures 5 and 6 have been amended to include the reference to a third series inductance; and

Figure 8 has been amended to include a third conductor and third series inductance.

Four replacement sheets of formal drawings are appended hereto. The replacement sheets include the amended figures and all of the prior figures on those sheets, namely:

Figures 3, 4, 5, 6 and 8.